Jose Alejandro Martinez C.

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Professional Summary

Mechanical engineer in the field of mechanical systems design, material science, mechanical testing, manufacturing, CAD/CAM/CNC, robotics, and engineering education. Current PhD. candidate in mechanical engineering, expected graduation August 2024.

Education

M.S. MECHANICAL ENGINEERING | MAY 2021 | MISSISSIPPI STATE UNIVERSITY

- GPA: 4.0/4.0
- *Graduate Research Assistant*: Research focused on computational molecular dynamics of phase transformations in steels. Phase transformations are modeled through the implementation of a mathematical model which describes the deformation gradients and boundary mechanics in between two phases. Here we can study the micro-mechanics of atom-to-atom interaction. Areas of interest within this research are: Elastic behavior, crystal plasticity, magnetization effects, alloying, dislocation networks, and relation to experimental results.

B.S. MECHANICAL ENGINEERING | MAY 2019 | MISSISSIPPI STATE UNIVERSITY

- GPA: 3.94/4.0
- *Undergraduate Research Assistant:* Analyzed various types of metal variations and their phase transformations. Simulated and examined different crystal structures to test their properties and reactions to external loads. Illustrated metals using programming tools to forecast material deficiencies.

Experience

INSTRUCTOR OF MECHANICAL ENGINEERING| MISSISSIPPI STATE UNIVERSITY | AUGUST 2021-PRESENT

- Taught multiple classes: Materials for Mechanical Engineering Design, Modeling and Manufacturing, Solid Mechanics Laboratory, Engineering Analysis, and Machine Design. (+650 Students)
- Developed course curriculum compliant with ABET for Modeling and Manufacturing. Implementation of a CNC laboratory with emphasis in CNC Milling with CAM. Responsible for the purchase, installation, operating policies, educational curriculum, and manuals, as well as maintenance for the equipment.
- Developing an ABET compliant course curriculum for Materials for ME Design. Implementing casting and foundries engineering as well as material testing in course curriculum.
- Aiding in the development of an advanced manufacturing lab for the mechanical engineering department (IDEE Lab) with the purchasing, installation, and logistics for industrial CNC mills, manual lathes and mills, CNC EDM, safety equipment, tooling, welding equipment, and other metalworking tools.

GRADUATE RESEARCH ASSISTANT | MISSISSIPPI STATE UNIVERSITY | MAY 2019 – AUGUST 2021

- Developed an ability to visualize and analyze molecular structures at lower length scales using molecular dynamics tools like LAMMPS (Large-scale Atomic/Molecular Massively Parallel Simulator).
- Understand deformation in metals through analysis of dislocation density, grain size, misorientation, and crystallographic properties.
- Developed a mathematical model that represents the phase transformation from austenitic to martensitic steels. This model works through the implementation of dislocations using an interfacial defect model.
- Developed a review of twinning interactions in Titanium's hexagonal close-packed structure.
- Taught a modeling and manufacturing course Fall 2020 and Spring 2021.

ENGINEERING TECHNICIAN | ADVANCE TESTING COMPANY, INC. | MAY 2017 – DECEMBER 2017

- Conducted materials testing and inspection on active construction sites. Assisted in various laboratory testing regarding material stress, strain, and tensile strength. Coordinated with paving crews to achieve a high-quality asphalt highway. Obtained NETTCP and AGC certifications for Density Testing Inspector and Plant Technician.

Skills & Abilities

SOLID MODELING AND STRESS ANALYSIS (SOLIDWORKS / FUSION 360 / ABAQUS)

- Certified Solidworks Associate: Mechanical Design (C-WAMCBDTUM5)
- Certified Solidworks Professional: Mechanical Design (C-DVWR7MS93Q)
- Certified Solidworks Professional: Computer Aided Manufacturing CAM (C-DU74YRFSEB)
- Certified Solidworks Associate: Additive Manufacturing (C-A3MEP7XHRB)
- Certified Solidworks Associate: Sustainability (C-68W53ULCJQ)
- Taught a modeling and manufacturing course at Mississippi State University since August 2020. (450+ Students as of July 2023)
- Proficient in finite element analysis using ABAQUS. Currently developing a materials/contact model for gecko adhesion as PhD Dissertation.

CNC PROGRAMING / COMPUTER AIDED MACHINING

- Solidworks Professional CAM skilled. Have developed a full course curriculum (ME-2133) for 3 axis CNC milling at Mississippi State University (+225 students as of August 2023).
- Able to perform machine maintenance: Turning, milling and wire EDM equipment.
- Ability to write manual g-code.

MATERIALS TESTING AND CHARACTERIZATION

- Strong background in materials atomic structure and mechanical characteristics at different length scales, as well as their property, structure, processing, and performance relationship. Can perform fatigue testing, impact testing, hardness testing, tensile and compression testing, bending test, and vibrations analysis. Taught a solid mechanics senior laboratory at Mississippi State University (+100 Upperclassmen).

LEADERSHIP

- Faculty advisor for the society of automotive engineers at Mississippi State University. (BAJA-SAE and Formula-SAE).
- Director of CNC Labs at Mississippi State University.
- Co-Advisor for Mississippi State Space Robotics team.

PROGRAMMING

- Proficient in MATLAB, Python, Fortran, and MathCAD.
- Solid Simulation: Abaqus, SolidWorks, and Fusion360.
- Microsoft office suite.

PUBLICATIONS

1. Barrett, C., Martinez, J., Nitol, M. (2022), "Faceting and Twin–Twin Interactions in 1121 and 1122 Twins in Titanium". MPDI - Metals: Theoretical, Computational, and Experimental Studies of Deformation Behavior in HCP Metals, Vol. 12, p. 895. DOI: https://doi.org/10.3390/met12060895